



Name: **Gypsum**

Derivation: From "gypsos" (Greek) chalk

Formula: $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$

Description: Different forms, such as Satin Spar (top left) and Desert Rose (below).

Gypsum is a source of Plaster of Paris and other plasters. It is a very soft mineral. It is a [pigment](#), and was found in Tutankhamun's paint-box. The rose type formation is called Desert Rose. Gypsum dissolves in water, and so such crystals, which take a long time to grow, only happen in very dry conditions, such as deserts.

Alabaster is another form of Gypsum. It is semi-translucent and often used for carving. The name comes from the Greek 'alabastros', said to be from Alabastron, a town in Egypt. But the ancients used the name Alabaster for [Calcite](#).

Larger pictures of Gypsum:

Gypsum - Desert Rose



Selenite

Name:

Derivation: From "selene" (Greek) moon

Formula: $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$

Description: Transparent diamond shaped crystals.

Selenite is the same chemical compound as gypsum. It was anciently supposed to wax and wane with the moon. This was probably because it used to drop out of any jewelry holding it. They thought this was because it got bigger and smaller, but in fact, selenite is very soft, and so would be worn away by any metal gripping it.





This is a similar colour but a different crystal formation.



Gypsum - Satin Spar



Gypsum from the cliffs in Penarth, near Cardiff



Cluster of Selenite crystals



A single Selenite crystal



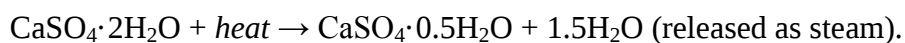
Alabaster



Types

Gypsum plaster (plaster of Paris)

Gypsum plaster, or **plaster of Paris**, is produced by heating [gypsum](#) to about 300 °F (150 °C).^[2]



When the dry plaster powder is mixed with water, it re-forms into gypsum. The setting of unmodified plaster starts about 10 minutes after mixing and is complete in about 45 minutes; but not fully set for 72 hours.^[3] If plaster or gypsum is heated above 392°F (200°C), [anhydrite](#) is formed, which will also re-form as gypsum if mixed with water.^[4]

A large gypsum deposit at [Montmartre](#) in Paris led "calcined gypsum" (roasted gypsum or gypsum plaster) to be commonly known as "plaster of Paris".^[5]

Plasterers often use gypsum to simulate the appearance of surfaces of wood, stone, or metal, on movie and theatrical sets for example. Nowadays, theatrical plasterers often use expanded [polystyrene](#), although the job title remains unchanged.

Plaster of Paris can be used to impregnate [gauze](#) bandages to make a sculpting material called [modroc](#). It is used similarly to clay, as it is easily shaped when wet, yet sets into a resilient and lightweight structure. This is the material that was (and sometimes still is) used to make classic plaster [orthopedic casts](#) to protect limbs with broken bones, the medical use having been partly inspired by the artistic use (see [orthopedic cast](#)). Set modroc is an early example of a [composite material](#).

Technical details

When heated, gypsum converts to the hemihydrate or an anhydrous form, depending on the temperature and duration of the heating process. Two [polymorphs](#) are known of the hemihydrate. The anhydrous calcium sulfate occurs in three forms, called anhydrite I, II, and III, each of which forms hydrates differently. The hemihydrate converts to the dihydrate. The anhydrite III is converted via the hemihydrate, whereas anhydrite II is converted directly into dihydrate without forming intermediates.^{[*clarification needed*] [1]}

Lime plaster

Main article: [Lime plaster](#)

Lime plaster is a mixture of calcium hydroxide and sand (or other inert fillers). Carbon dioxide in the atmosphere causes the plaster to set by transforming the calcium hydroxide into calcium carbonate ([limestone](#)). [Whitewash](#) is based on the same chemistry.

To make lime plaster, [limestone](#) (calcium carbonate) is heated to produce [quicklime](#) (calcium oxide). Water is then added to produce [slaked lime](#) (calcium hydroxide), which is sold as a wet putty or a white powder. Additional water is added to form a paste prior to use. The paste may be stored in airtight containers. When exposed to the atmosphere, the calcium hydroxide very slowly turns back into calcium carbonate through reaction with atmospheric carbon dioxide, causing the plaster to increase in strength.

Lime plaster was a common building material for wall surfaces in a process known as [lath and plaster](#), whereby a series of wooden strips on a [studwork](#) frame was covered with a semi-dry plaster that hardened into a surface. The plaster used in most lath and plaster construction was mainly [lime plaster](#), with a cure time of about a month. To stabilize the lime plaster during curing, small amounts of plaster of Paris were incorporated into the mix. Because plaster of Paris sets quickly, "retardants" were used to slow setting time enough to allow workers to mix large working quantities of lime putty plaster. A modern form of this method uses expanded metal mesh over wood or metal structures, which allows a great freedom of design as it is adaptable to both simple and compound curves. Today this building method has been partly replaced with [drywall](#), also composed mostly of gypsum plaster. In both these methods a primary advantage of the material is that it is resistant to a fire within a room and so can assist in reducing or eliminating structural damage or destruction provided the fire is promptly extinguished.

Lime plaster is used for [frescoes](#), where [pigments](#), diluted in water, are applied to the still wet plaster.

USA and Iran are the main plaster producers in the world.^[*citation needed*]

Cement plaster

See also: [Cement render](#)

Cement plaster is a mixture of suitable plaster, sand, [portland cement](#) and water which is normally applied to masonry interiors and exteriors to achieve a smooth surface. Interior surfaces sometimes receive a final layer of gypsum plaster. Walls constructed with [stock bricks](#) are normally plastered while [face brick](#) walls are not plastered. Various cement-

based plasters are also used as proprietary spray [fireproofing](#) products. These usually use [vermiculite](#) as lightweight aggregate. Heavy versions of such plasters are also in use for exterior fireproofing, to protect LPG vessels, pipe bridges and vessel skirts.

Cement plaster was first introduced in America around 1909 and was often called by the generic name *adamant plaster* after a prominent manufacturer of the time. The advantages of cement plaster noted at that time were its strength, hardness, quick setting time and durability.^[6]

Heat resistant plaster

Heat resistant plaster is a building material used for coating walls and chimney breasts. Its purpose is to replace conventional gypsum plasters in cases where the temperature can get too high for gypsum plaster to stay on the wall. Heat resistant plaster should be used in cases where the wall is likely to exceed temperatures of 50°C.^[citation needed]

n medicine

Plaster is widely used as a support for broken bones; a bandage impregnated with plaster is moistened and then wrapped around the damaged limb, setting into a close-fitting yet easily removed tube, known as an [orthopedic cast](#).

Plaster is also used in preparation for [radiotherapy](#) when fabricating individualized immobilization shells for patients. Plaster bandages are used to construct an impression of a patient's head and neck, and liquid plaster is used to fill the impression and produce a plaster bust. The transparent material [polymethyl methacrylate](#) (Plexiglas, Perspex) is then vacuum formed over this bust to create a clear face mask which will hold the patient's head steady while radiation is being delivered.^[citation needed]

In dentistry, plaster is used for mounting casts or models of oral tissues. These diagnostic and working models are usually made from dental stone, a stronger, harder and denser derivative of plaster which is manufactured from gypsum under pressure. Plaster is also used to invest and flask wax dentures, the wax being subsequently removed by "burning out," and replaced with flowable denture base material. The typically acrylic denture base then cures in the plaster investment mold. Plaster investments can withstand the high heat and pressure needed to ensure a rigid denture base. Moreover, in dentistry there are 5 types of gypsum products depending on their consistency and uses: 1) impression plaster (type 1), 2) model plaster (type 2), dental stones (types 3,4 and 5)^[citation needed]

In orthotics and prosthetics, plaster bandages traditionally were used to create impressions of the patient's limb (or residuum). This negative impression was then, itself, filled with plaster of paris, to create a positive model of the limb and used in fabricating the final medial device.

In addition, [dentures](#) (false teeth) are made by first taking a [dental impression](#) using a soft, pliable material that can be removed from around the teeth and gums without loss of fidelity and using the impression to creating a wax model of the teeth and gums. The model is used to create a plaster mold (which is heated so the wax melts and flows out) and the denture materials are injected into the mold. After a curing period, the mold is opened and the dentures are cleaned up and polished.

In fire protection